

What is claimed is:

Sub B1  
1 1. An imaging module comprising:  
2 a frame;  
3 a circuit board mounted to said frame;  
4 an image sensor carried by said circuit board; and  
5 at least one illumination light source for illuminating a  
6 target area.

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1        5. The imaging module of claim 1, wherein said circuit  
2 board carries essentially all image sensor signal processing  
3 circuitry, image capture circuitry, and decoding and or  
4 recognizing circuitry of an optical reader in which said  
5 module is to be installed.

1        6. The imaging module of claim 1, wherein said image  
2 sensor is a 2D image sensor and wherein said module further  
3 includes at least one aiming light source and associated  
4 optics for projecting a solitary horizontal line aiming  
5 pattern in a target area.

1        7. The imaging module of claim 1, wherein said frame  
2 defines top and side sidewalls of said module, and wherein  
3 said sidewalls and said circuit board define a cubic  
4 rectangular configuration.

1        8. The imaging module of claim 1, wherein said frame  
2 includes substantially rigid top and side sidewalls defining a  
3 partially enclosed contained area, and wherein said at least  
4 one illumination source is disposed inside said contained  
5 area, whereby said at least one illumination source is  
6 structurally protected by said frame.

1        9. The imaging module of claim 1, wherein said frame  
2 includes substantially rigid top and side sidewalls defining a  
3 partially enclosed contained area, and wherein said at least  
4 one illumination source and said image sensor are disposed  
5 inside said contained area, whereby said at least one  
6 illumination source and said image sensor are structurally  
7 protected by said frame.

1        10. The imaging module of claim 1, wherein said frame  
2 includes substantially rigid top and side sidewalls, and  
3 wherein a combination of said circuit board and said top and  
4 side sidewalls defines a partially enclosed contained area,  
5 and wherein said at least one illumination source is disposed  
6 inside said contained area, whereby said at least one  
7 illumination source is structurally protected by a combination  
8 of said circuit board and said frame.

1        11. The imaging module of claim 1, wherein said frame  
2 includes substantially rigid top and side sidewalls and  
3 wherein a combination of said circuit board and said top and  
4 side sidewalls defines a partially enclosed contained area,  
5 and wherein said at least one illumination source and said  
6 image sensor are disposed inside said contained area, whereby  
7 said at least one illumination source and said image sensor  
8 are structurally protected by a combination of said circuit  
9 board and said frame.

1        12. The imaging module of claim 10 wherein essentially  
2 an entirety of illumination sources of said module are  
3 incorporated in said contained area.

*Swan* → 1        13. The imaging module of claim 1, wherein said back  
2 plate includes a center recess for receiving and aligning said  
3 image sensor.

1        14. The imaging module of claim 1, wherein said back  
2 plate includes a center recess for receiving and aligning said  
3 image sensor and at least one side recess for accommodating  
4 electrical components emanating forwardly of said circuit  
5 board.

Sub B4  
1 15. The imaging module of claim 1, further includ<sup>ing</sup> a  
2 pair of aiming light sources, and an aperture plate having a  
3 pair of apertured domes disposed over said light sources for  
4 shaping light emanating from said aiming light sources.

a  
1 16. The imaging module of claim 1, wherein said frame  
2 includes a back plate, and wherein said at least one  
3 illumination source further includes illumination and aiming  
4 LED's having leads extending through said back plate and being  
5 electrically connected to said circuit board.

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Sub B4  
1 17. The imaging module of claim 1, wherein said at least  
2 one illumination source further includes illumination and  
3 aiming LED's being electrically connected to said circuit  
4 board, and wherein said module further comprises:  
5 an aperture plate including domes having slit apertures  
6 for shaping light emanating from said aiming LED's being fit  
7 over said aiming LED's; and  
8 a diffuser plate including optics for diffusing light  
9 emanating from said illumination LED's being positioned in  
10 said optical reader forward of said aperture plate.

1 18. The imaging module of claim 17, further including  
2 means adapting said diffuser plate to be snap-fit onto said  
3 frame.

1 19. The imaging module of claim 17, further comprising:  
2 means adapting said diffuser plate to be snap-fit onto  
3 said frame; and  
4 means adapting said aperture plate to be biased toward

1 said back plate when said diffuser plate is snap-fit onto said  
2 frame.

1 20. An imaging module comprising:  
2 a frame;  
3 a circuit board mounted to said frame;  
4 an image sensor carried by said circuit board; and  
5 at least one illumination light source for illuminating a  
6 target area.

1 21. The optical reader of claim 20, wherein said at  
2 least one illumination light source is mounted to said circuit  
3 board, whereby said circuit board carries both of said image  
4 sensor and said at least one illumination light source.

1 22. The optical reader of claim 20, wherein said imaging  
2 module further includes at least one aiming light source, and  
3 wherein said at least one illumination light source and said  
4 at least one aiming light source are each mounted to said  
5 circuit board, whereby said circuit board carries each of said  
6 image sensor, said at least one illumination light source and  
7 said at least one aiming light source.

1 23. The optical reader of claim 20, further comprising  
2 at least one planar optical component and wherein said frame  
3 comprises sidewalls having resilient fingers formed therein  
4 for receiving and securing said optical component in said  
5 frame in a stationary position in said frame without use of  
6 adhesives or any additional mechanical securing apparatuses or  
7 agents.

1        24.    The optical reader of claim 20, wherein said  
2 circuit board carries essentially all image sensor signal  
3 processing circuitry, image capture circuitry, and decoding  
4 and or recognizing circuitry of an optical reader in which  
5 said module is to be installed.

1        25.    The optical reader of claim 20, wherein said image  
2 sensor is a 2D image sensor and wherein said module further  
3 includes at least one aiming light source and associated  
4 optics for projecting a solitary horizontal line aiming  
5 pattern in a target area.

1        26.    The optical reader of claim 20, wherein said frame  
2 defines top and side sidewalls of said module, and wherein  
3 said sidewalls and said circuit board define a cubic  
4 rectangular configuration.

1        27.    The optical reader of claim 20, wherein said frame  
2 includes substantially rigid top and side sidewalls defining a  
3 partially enclosed contained area, and wherein said at least  
4 one illumination source is disposed inside said contained  
5 area, whereby said at least one illumination source is  
6 structurally protected by said frame.

1        28.    The optical reader of claim 20, wherein said frame  
2 includes substantially rigid top and side sidewalls defining a  
3 partially enclosed contained area, and wherein said at least  
4 one illumination source and said image sensor are disposed  
5 inside said contained area, whereby said at least one  
6 illumination source and said image sensor are structurally  
7 protected by said frame.

1        29. The optical reader of claim 20, wherein said frame  
2 includes substantially rigid top and side sidewalls, and  
3 wherein a combination of said circuit board and said top and  
4 side sidewalls defines a partially enclosed contained area,  
5 and wherein said at least one illumination source is disposed  
6 inside said contained area, whereby said at least one  
7 illumination source is structurally protected by a combination  
8 of said circuit board and said frame.

1        30. The optical reader of claim 20, wherein said frame  
2 includes substantially rigid top and side sidewalls and  
3 wherein a combination of said circuit board and said top and  
4 side sidewalls defines a partially enclosed contained area,  
5 and wherein said at least one illumination source and said  
6 image sensor are disposed inside said contained area, whereby  
7 said at least one illumination source and said image sensor  
8 are structurally protected by a combination of said circuit  
9 board and said frame.

1        31. The optical reader of claim 29 wherein essentially  
2 an entirety of illumination sources of said module are  
3 incorporated in said contained area.

1        32. The optical reader of claim A1, wherein said back  
2 plate includes a center recess for receiving and aligning said  
3 image sensor.

1        33. The optical reader of claim 20, wherein said back

1 plate includes a center recess for receiving and aligning said  
2 image sensor and at least one side recess for accommodating  
3 electrical components emanating forwardly of said circuit  
4 board.

1 34. The optical reader of claim 20, further includes a  
2 pair of aiming light sources, and an aperture plate having a  
3 pair of apertured domes disposed over said light sources for  
4 shaping light emanating from said aiming light sources.

1 35. The optical reader of claim 20, wherein said frame  
2 includes a back plate, and wherein said at least one  
3 illumination source further includes illumination and aiming  
4 LED's having leads extending through said back plate and being  
5 electrically connected to said circuit board.

1 36. The optical reader of claim 20, wherein said at  
2 least one illumination source further includes illumination  
3 and aiming LED's being electrically connected to said circuit  
4 board, and wherein said module further comprises:  
5 an aperture plate including domes having slit apertures  
6 for shaping light emanating from said aiming LED's being fit  
7 over said aiming LED's; and  
8 a diffuser plate including optics for diffusing light  
9 emanating from said illumination LED's being positioned in  
10 said optical reader forward of said aperture plate.

1 37. The optical reader of claim 36, further including  
2 means adapting said diffuser plate to be snap-fit onto said  
3 frame.



Add As 7

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